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Latin American Regional Office (LARO)

Program Support Unit

Work Document

Bogota, May 1976

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NATIONAL DEVELOPMENT POLICIES

INFORMATION ON POLICIES,

ACTIVITIES AND RESEARCH NEEDS

- . -

v.2

ECUADOR : CASE STUDY

Research Situation and Needs in the Agricultural Sector

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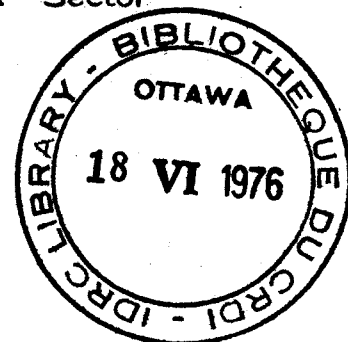


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INTRODUCTION

This document consists of two parts which describe, respectively, Ecuador's agricultural research situation and research needs in this sector.

In addition to the documents mentioned in the bibliography, we have used as a source a set of interviews with Ecuadorian scientists, managers and planners related to the sector and whom we consider representative of its main institutions. These interviews were possible thanks to the collaboration of the National Planning Board's Science and Technology Division and to INIAP's staff.

The list of interviews and the guide used for the interviews appears in the Appendix.

We have tried to reflect, as faithfully as possible, the opinions of the interviewees on the problems discussed, limiting ourselves to synthesizing and organizing their opinions and delving into some aspects by means of analysis only when we have considered it necessary for the sake of clarity.

Bogota, May, 1976.-

I. RESEARCH SITUATION

Agricultural research in Ecuador, up to the creation of the National Agricultural Research Institute (INIAP), was carried out by several public, semi-public and private institutions. Research was dispersed and isolated.

The need of organizing research according to the country's development plans and specially of its being planned and directed with unified criteria which would allow its orderly execution, lead to the creation of INIAP. This divided Ecuador's agricultural development in two; before and after INIAP.

1. INIAP :

INIAP was created by Emergency Decree No. 19 on June 11, 1959, but only went into operation in January 1962 due to budgetary problems.

It is a nationwide entity based in Quito and dependent on the Ministry of Agriculture and Animal Husbandry.

1.1 Basic Objectives.-

- a) Carry out research in the agricultural field in order to develop, orient and stimulate agricultural production and cattle raising in the country, by trying to increase agricultural production per area unit and improving quality. This increase is aimed at satisfying the domestic market's needs as well as at promoting exports, reducing

importation of agricultural products and supplying industry derived from agriculture.

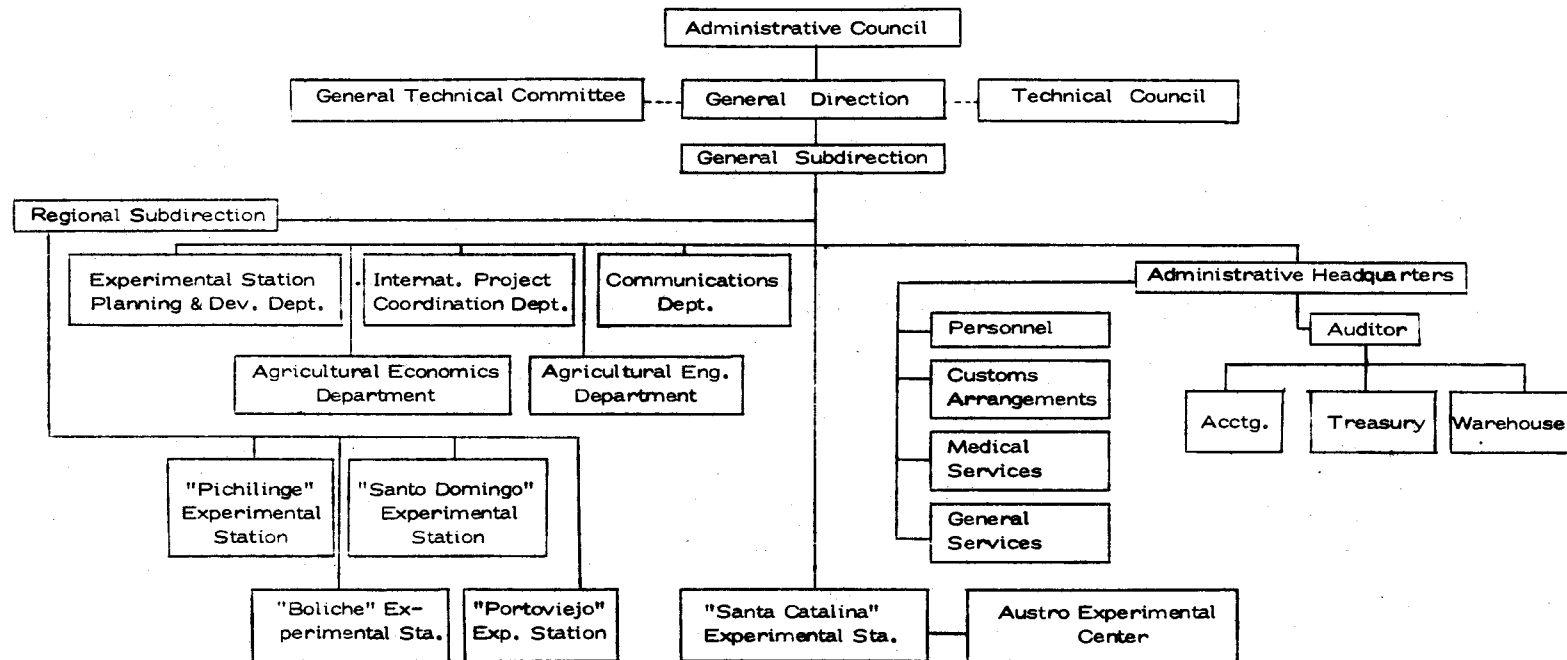
- b) Set up experimental stations and sub-stations (see page), and conduct Regional trials (see page).
- c) Sponsor academic professional training with the aim of increasing the number of technically capacitated people for research and promulgation.
- d) Collaborate with national and international agricultural institutions of services.

1.2 Organization.-

The Institute's organization is as follows :

- a) Central Administration: It is made up of the General Direction in Quito and the General Subdirection in Guayaquil plus a Regional Subdirection in Quito.
- b) Experimental Stations: At present it has five Experimental Stations and one Regional Experimental Center.

- I N I A P ' S S T R U C T U R E -



1. "Santa Catalina" Experimental Station.-

This was INIAP's first experimental center, created in 1962. It is located to the South of Quito in a cold temperature climate, and covers 950 Ha.

Research is carried out on the following crops: wheat, barley, oats, corn, potato; in the animal husbandry field research is done on bovine and porcine cattle.

It has the following support programs: Soils and fertilizers, phytopathology, entomology, weed control, statistics and nutrition and seed production.

It is equipped with soils, nutrition, farinology and phytopathology laboratories.

The "Santa Catalina" Station collaborates with the Austro Experimental Center in research projects on barley, wheat, oats, corn, grasses and cattle raising as well as in the soils and fertilizers, phytopathology and weed control departments.

2. "Pichilingue" Experimental Station.-

Before passing into the hands of INIAP it was managed by the Interamerican Cooperative Agricultural Service and was transferred to INIAP on January 1, 1963. It is located in a humid tropical zone and its area is 1,200 Ha.

Research Programs: Cacao, coffee, grasses, corn and meat cattle.

Support Programs: Soils, entomology, phytopathology, seed production and school for overseers.

This Station also has the "Cattle Qualification Center", whose objective is to efficiently improve bovine cattle production through theoretical-practical training of all people related to this type of production.

3. "Boliche" Experimental Station.-

This, INIAP's youngest station, was created in 1969. It is situated west of Guayaquil in the tropical zone and consists of 200 Ha.

Research is done on cotton, peanut, sesame, soybean, rice, wheat, leguminous grains.

It has the following support programs : soils, entomology, phytopathology, seed production and weed control.

Through this Station, INIAP has cooperation and technical assistance agreements with several institutions which work in the area.

Research in Banana **: In 1973, through an agreement between INIAP and the National Banana Program, the "Bo-

** Because of internal problems, IRPF withdrew, leaving the country without technicians and without information. As a result, in the past three years INIAP has been showing a banana program which is still in the incipient phase.

liche and Pichilingue" Stations' phytopathology, entomology, weed control and soils and fertilizers departments began observation at a local level and mainly with regional trials to contribute to the development of the crop. The main objectives of this research are :

- Investigate the problems which affect Ecuador's banana production with a view to increasing yield per hectare.
- Carry out research on economics related to production factors.
- Carry out nutrition studies for the utilization of banana for human and animal consumption.
- Training of technical personnel.

4. "Santo Domingo" Experimental Station.-

This was created in July 1963. It is located in the middle of the equatorial zone, hot and damp, in Pichincha Province. It has 250 Ha. This station does research on: African palm, corn, grasses and porcine cattle. Its support programs : soils, entomology and phytopathology.

African palm is the main crop in the area and one of the most required for domestic oil consumption. At present, the station has an oil extracting plant and a laboratory for quality analysis. This plant's objective is to research the field of the transformation of the product itself. Its capacity is one and a half tons of racemes per hour.

5. "Portoviejo" Experimental Station.-

This was created in 1962 and is situated in a dry tropical zone in the province of Manabi. Its area is 88 Ha.

Research there is directed toward cotton, corn, wheat, peanut, sesame, soybean and castor oil plant.

It also has soils, entomology, phytopathology and porcine cattle support programs.

This station has been converted into an information center for all the area. Students, farmers and extensionists, all receive aid there.

Austro Experimental Center .-

This regional experimental center was begun in 1974 on 7 Ha. donated by INIAP and CREA (Austro Regional Corp.). It is located in Chuquipata, Azuay province.

Basic work on phyto-improvement and complementary programs are effected here as well as regional trials. The center is also used as demonstration and diffusion center of the most modern and recommended techniques for cultivating the different crops.

1.3 Activities in Process.-

a) Regional Trials :

300 regional trials are carried out during the year in the country's different agricultural areas to verify research results as well as behavior of varieties. The farmers and cattle ranchers of each area collaborate with the Institute's technicians in this. This activity allows direct diffusion of the technological processes obtained.

In the following pages, we present an inventory of the research projects carried out in the experimental stations and whose results have been verified in regional trials. (See Table No. 1).-

Table No. 2 shows a summary of INIAP's seed delivery.

b) Courses and Seminars :

In order to aid promulgation of technology, INIAP organizes theoretical-practical courses and seminars at different levels and in various areas of the country. In this way, the knowledge acquired is transmitted through a leadership process which INIAP considers the most effective in a rural society like Ecuador's; it also allows better coordination with other institutions.

TABLE No. -1-

Type of Research Carried out in the Five Experimental Stations - INIAP -

Type of Research	Santa Catalina	Pichilingue	Porto-Viejo	Santo Domingo	Boliche
<u>Crops:</u>					
Cereals: Wheat	x	xx	-	x	x
Barley	x	xx	-	-	-
Oats	x	xx	-	-	-
Potato	x	xx	-	-	-
Corn-Sorghum	x	xx	xx	x	x
Leguminous plants	x	xx	xx	oo	oo
Grass and forrage	x	xx	xx	oo	x
Cacao	x	-	xx	-	oo
Coffee	x	-	xx	-	-
African Palm	x	-	-	xx	-
Rice	x	-	xx	-	xx
Cotton	x	-	-	xx	xx
Short cycle oleaginous plants :					
Soybean	x	-	-	xx	xx
Peanut	x	-	-	xx	xx
Sesame	x	-	-	xx	xx
Castor					
Oil plant	x	-	-	xx	xx
Fruit trees - Citrus		oo	oo	-	oo
<u>Cattle:</u>					
Porcine		xx	-	oo	oo
Ovine		xx	-	-	-
Bovine: Dairy	x	xx	xx	oo	oo
Beef	x	x	xx	x	x
<u>Agricultural Techniques:</u>					
Weed control		xx	xx	xx	xx
Entomology	x	xx	xx	xx	xx
Phytopathology	x	xx	xx	xx	xx
Soils & Fertilizers	x	xx	xx	xx	xx
Product. of improved seed	x	xx	xx	xx	xx
Agricultural Econ.		xx	xx	xx	xx

xx Programs being carried out

oo Projects

x Regional trials in process

Source: "Primera Década de la Investigación Agropecuaria Ecuatoriana", INIAP, 1972.-

TABLE No. -2-

INIAP's Seed Delivery and Delivery of Propagation Material 1963-1970			
Crop	x National Production (Ha./qq.)	INIAP's Production (q.q.)	Quantities of Seed Delivered
Cacao	4	50	47.053 ears
Cacao			245.916 plants
Cotton	10	50	2.142 pounds
Peanut	12		13.005 pounds
Sesame	12		1.380 pounds
Grasses			447 pounds
Grasses			1.331 cubic meters of ve- getative mate- rial
Wheat	20	118	10.398 quintals
Potato	200	1.200	4.770 quintals
Oats	16	70	725 quintals
Porcine cattle			1.340 animals
Coffee	6		8.956 pounds
Coffee			223.815 plants
Corn (Coast)	4	80	4.773 quintals
Corn (Mountain)	15	100	1.107 quintals
African Palm		2.5 tons	885.486 seeds
African Palm			80.847 plants

Source : Ibid.-

c) Field Days :

On the spot demonstrations where differences are notable and any belief can be modified by the evidence provided by facts is considered by INIAP one of the methods for teaching and modifying technological practice in the countryside.

d) Publications :

The Institute has published 13 annual reports in which it has informed on trials carried out and on the results obtained during the 1962-1974 period. It has other methods of information such as*:

- Technical bulletins
- Miscellaneous publications
- Divulgence bulletins
- Leaflets.

1.4 Financial Resources.-

The government's budgetary assignation to the Institute from 1962 to 1971** has reached S./252.190.463.85. This has been inverted in :

* For further information see "Esto es INIAP", Ecuador, August 1975 and the "Informes Divulgativos" for each year.

** "Primera Década de la Investigación Agropecuaria Ecuatoriana". INIAP, March 1972.-

- ° The creation of the five experimental Stations, equipped with modern work facilities, including the country's two most complete seed plants.
- ° The development of 19 research programs which produced 35 varieties of the 14 crops of national importance, economically : *
 - ° Wheat
 - ° Barley
 - ° Oats
 - ° Potato
 - ° Coastal corn
 - ° Mountain corn
 - ° Cacao
 - ° Coffee
 - ° Cotton
 - ° Rice
 - ° Soybean
 - ° Sesame
 - ° Castor Oil plant
 - ° African palm
- ° Financing of 141 theses of University graduates in the country, researching problems of the countryside.
- ° Courses at different levels (See Table No. 5), training 2,340 people who work in the sector.
- ° Preparation of 54 Masters and 8 Doctors of Agronomy and Veterinary in foreign countries.

* See Appendix: List of Varieties delivered to the Farmers by INIAP.-

The Budget from 1973 to 1976 was as follows : *

1973	S/ 127,015,000 Including a loan of 32 million Sucre from IDB
1974	S/ 162,000,000 Including a loan of 25 million Sucre from IDB
1975	S/ 165,000,000
1976	S/ 151,105,000 At present another loan from EDB is being negotiated.

Apart from its budgetary assignation, INIAP has received large sums from different international organisms either for infrastructure development or for training of personnel or technical advice.

Following is a list of the main international and institutional organisms which collaborate with INIAP as well as the main aspects of their aid. :

• Rockefeller Foundation:

Has provided aid even before the creation of INIAP. It has assigned a representative to the country and through him has permitted technical-practical training and, specially, post-graduate academic training for almost all of INIAP's technicians and has provided INIAP with field and laboratory equipment. Furthermore, in relation with this foundation,

* Data provided by Mr. Carlos Elizalde, from INIAP.-

INIAP receives collaboration from CIAT and CIMMYT for training of staff and technical advice.

° Government of the Netherlands:

An agreement was established between these and the Ecuatorian government to collaborate with the "Santa Catalina" experimental station in the dairy cattle research and teaching programs. For this purpose the "dairy farm school" has been installed with modern buildings and equipment donated by the government of the Netherlands.

Besides economic aid, technical aid from Dutch advisors and professors has also been received. This agreement came to an end in 1972.

° IDB :

Has granted the Institute several loans. **The first** became effective in 1970 and was invested in the following :

- ° Infrastructure
- ° Construction
- ° Installations
- ° Liquid assets
- ° Office, printing and communications equipment.
- ° Agricultural machinery
- ° Vehicles and transportation equipment.
- ° Tools and diverse equipment
- ° Scholarships for training of technical personnel
- ° Technical advise

The utilization calendar was set for three years. Two other loans were granted in 1973 and 1974 for 32 and 25 million Sucres, respectively. Another loan is about to be granted for this year.

- ° University of Florida:

INIAP has signed two technical assistance agreements with this University. The first, according to the INIAP/IDB project, for the establishment of a Department of Agricultural Economics, in which the Advisors would train INIAP's technical staff and do research. The second agreement according to the World Bank Project, is for research on beef and dairy cattle, tropical and high altitude grasses and vegetable nutrition.

- ° American Cocoa Research Institute-AGRI:

Its aid consists of advise from specialized technicians and scholarships for training personnel in cacao improvement and phytopathology.

The Universidad de Las Indias Occidentales also collaborates in the cacao program.

- ° Swiss Government:

It signed an agreement with the Ecuadorian government through which, beginning in 1972 and during 5 years, the "Animal Nutrition Center" was set up in the "Santa Catalina" experimental station. The Swiss government contributed

two technicians and the necessary equipment for the nutrition laboratory.

- ° USAID :

Collaborates through technical assistance agreement granted to the cacao and weed control programs, with technical advisors and equipment.

- ° IICA:

Has offered collaboration for international meetings and scholarships for practical training of INIAP's own personnel.

1.5 Human Resources.-

INIAP considers having well trained and capacitated staff one of the most important factors for its efficiency.

INIAP selects its personnel and provides the means for its professional preparation and the development of its research-teaching activities.

For the first time in the country, professional selection and training is being planned and carried out beginning with university graduates and ending with a Master of Science or Doctor of Agricultural Sciences degree (Ph.D.).

INIAP has made efforts so that not only its own personnel benefits from this training by making it available to other types of people outside the Institute such as technicians and producers who work in the agricultural sector.

By applying this criterion, INIAP has been able to make up a good team of technical personnel. At present (August 1975), it has 299 technicians in its experimental stations and in its main offices, 68% of whom have a university education.

Tables No. 3, 4, 5 and 6 show the human resources and training which the Institute has developed.

2. THE AGRICULTURAL ENGINEERING AND VETERINARY MEDICINE DEPARTMENT

The Agricultural Engineering and Veterinary Medicine Faculty of the Universidad Central del Ecuador was one of the Institutions which most backed the initiative of creating INIAP. However, once this was carried out, the connection between these two institutions has been severed.

The Directors of the Faculty have expressed through its Dean, Mr. Nelson Peñafiel, their concern over this situation as they expected important benefits for the Faculty from the creation of INIAP.

Research in the Faculty has practically come to a stand still. There is no infrastructure appropriate and not enough for pregrad students to practice and do research. Research has been limited to graduation theses, which have not followed a specific plan to give them continuity but instead the private interests of those who finance them. In order to develop his thesis, a student must be financed and this generally comes from private enterprises, or from the Development Bank, or from INIAP, or from the student's own resources.

TABLE No. -3-

DISTRIBUTION OF TECHNICAL PERSONNEL ACCORDING TO EDUCATIONAL LEVEL AND LOCATION							
	Agronomists	Engineers Agric. Other	Veterinary Doctors	M.S.	Ph.D.	Total	
Central Office	--	4	10	--	1	1	16
Santa Catalina	33	25	40	2	18	2	120
Pichilingue	14	22	16	1	6	1	60
Santo Domingo	12	5	3	3	4	--	27
Boliche	9	22	20	--	6	1	58
Portoviejo	3	10	--	--	2	--	15
Austro Regional Center	2	1	--	--	--	--	3
TOTAL:	73	89	89	6	37	5	299

TABLE No. - 4 -

PERCENTAGE DISTRIBUTION OF STAFF WITH A UNIVERSITY EDUCATION

Doctors of Philosophy	2,3 %
Masters of Science	16,9 %
Agricultural Engineers	40,3 %
Agronomists	32,4 %
Veterinary Doctors	2,6 %
Chemists	2,6 %
Journalists	1,2 %
Economists	1,2 %
Arquitects	0,5 %

TABLE No. -5-

SUMMARY OF NUMBER AND TYPE OF COURSES GIVEN BY INIAP FROM 1964 TO JUNE 1975		
Courses For	Total No.	No. of People
Future foremen	7	121
Milkers	2	40
Extensionists	21	545
Foremen - Managers	6	108
University students	22	607
Secondary School students	14	445
Rural teachers	1	30
World Bank Agents	1	20
Cattle raisers	9	508
Pig farmers	10	464
4-F Club leaders	3	116
Mechanics Operators	1	50
Technicians from the Ministry of Agriculture and Animal Husbandry	11	240
Personnel from the Development Bank	1	22
Members of the Armed Forces	5	104
Industrialists	1	27
Cattle raising Cooperatives	1	20
INIAP Technicians	18	542
Foreign Technicians	1	2
TOTAL:	135	4.011

Source: "Esto es INIAP", INIAP, August, 1975.-

TABLE No. -6-

INIAP'S EXPENSES IN TRAINING TECHNICAL PERSONNEL FOR OBTAINING UNIVERSITY DEGREES FROM 1962 TO JUNE 30th, 1971		
No. of Scholarship Holders	Experimental Station	Total Expense in Sucres
68	Santa Catalina	1.066.390.00
34	Pichilingue	692.535.00
20	Portoviejo	472.095.00
10	Sto. Domingo	178.970.00
9	Boliche	177.350.00
141		2.487.340.00

Source: "Primera Década de la Investigación Agropecuaria Ecuatoriana". INIAP, March, 1972.-

Both INIAP and the Development Bank have an agreement with the Faculty for setting criteria and conditions for the students chosen to develop their graduation theses in relation to one of their programs.

The number of students selected by INIAP is very limited and this is the only mechanism through which they have contact with this institution.

The lack of coordination negatively affects the formation of human resources from the basic levels. This harms the Institute because its human resources must come from there. It also harms the Faculty as it does not benefit from INIAP's human resource and physical infrastructure. And lastly, it also harms the country which does not benefit from solid information for its technicians who will be in charge of the sector's development.

In view of this situation, the Faculty is trying to create conditions for developing its own experimental centers. It has already bought several farms but they still lack necessary equipment :

- "La Tola" farm near Tumbaco.- There are projects for enlarging it for research and for constructing buildings for a post-graduate Institute.
- "Rumipamba" farm in Cotopaxi.- This is to be a research and teaching center with housing, classrooms, laboratories, milking room, stable, building and equipment for artificial insemination and for treatment of milk.
- The Faculty is trying to buy a plot on the Coast near Santo Domingo de Los Colorados.
- It is buying a plot near Guayabamba, a dry tropical zone where for the past year research has been carried out on artificial irrigation.

3. THE TECHNOLOGICAL RESEARCH INSTITUTE

The Technological Research Institute is part of National Polytechnical School which has "the responsibility of participating directly in the country's industrialization process by taking advantage of its natural resources and improving existing industry by better use of technology and adequate quality control". *

This is carried out through technological research of which the Institute of Technological Research is in charge.

3.1 Objectives.-

The Institute's general objectives are :

- a) Promote, stimulate and develop technological research to support the development of Ecuadorian industry.
- b) Investigate use, conservation and transformation of the country's natural resources through technical-economic studies.
- c) Study the development of new industries based on national raw materials.
- d) Offer technical advice on the many problems

* Taken from the document: "Instituto de Investigaciones Tecnológicas de la Escuela Politécnica Nacional", Ecuador. Mimeograph.-

faced by industry.

- e) Promote the use of modern techniques in industrial establishments.
- f) Help improve industry which is already established.

3.2 Organization.-

The Institute has a General Director and Department Heads.

3.2.1 Departments:

- Programming and Coordination
- Prospecting of Raw Materials
- Quality Analysis and Control
- Research on Products
- Research on Processes
- Projects

3.2.2 Services :

- Library and Information
- Maintenance
- Purchasing
- Accounting and Secretariat

3.3 Work Programs.-

- Food
- Wood, cellulose and paper
- Vegetable extracts

- Textiles
- Petroleum
- Metal-mechanics
- Energy Generation and Conduction
- Hydraulic Models
- Construction Materials

3.4 Projects Carried out .- *

Projects have been carried out on different aspects of the programs :

3.4.1 Food :

- Oils and fats
- Fruits and vegetables
- Legumes and cereals
- Flours and starches
- Proteins

3.4.2 Wood, cellulose and Paper :

3.4.3 Vegetable Extracts :

- Steroids
- Essential oils
- Oncostatic
- Bactericides and Viricides
- Colorings
- Flavorings
- Waxes

* For further information see mimeographed document "Instituto de Investigaciones Tecnológicas de la Escuela Politécnica Nacional". Ecuador.-

3.4.4 Petroleum :

4. OTHER INSTITUTIONS OR ORGANISMS
WHICH DO RESEARCH

The following is a brief description of other institutions or organisms which, in order to fulfill their specific jobs, must develop some type of research.

4.1 CESA.-

The Ecuadorian Agricultural Service Center "CESA", is an organization founded by the Catholic Church in 1968, as a technical team for directing the Agrarian Reform of lands belonging to the church, an activity which later spread to other services.

4.1.1 Objectives :

This organization's objective is "the promotion of the poor peasant through the provision of an integral pack of services destined to improve his participation in decisions which are fundamental to him and in the product he is generating"*.

* Taken from the interview with Fernando Velasco -CESA- Ecuador, March 1976.-

It began its activities with an Agrarian Reform program, due to the Ecuadorian Episcopal Conference's desire to promote it in the possessions of the different ecclesiastical jurisdictions. Thus, the Ecuadorian Institute for Social Development, INEDES, formed its Agrarian Reform Secretariat which was later integrated into CESA.

The integral service pack consists of :

- Granting loans to peasant organizations
- Giving technical assistance
- Designing marketing mechanisms with the peasant groups
- Offering aid for infrastructure and machinery
- Offering training which will allow the peasant movement new and complex functions in the economic, social, political and cultural fields.

4.1.2 Organization :

CESA is presently functioning through four areas -work zones-, each one with its own team in charge, managed by a central team based in Quito.

These areas, in their turn, have been divided for work reasons into sub-areas: *

* More detailed information on CESA can be found in the document "Una Experiencia en Desarrollo Rural", CESA, Quito, June 1974, and in an Interview to Fernando Velasco, Quito, March 1976, typed, IDRC-LARO, PSU File.-

1. Coastal Area: Located to the inside of the Guayas river basin. It is divided into three sub-areas: North-Daule, Southeast Daule and Los Rios.
2. Cañar Area: Is the smallest area and its work is concentrated in the "San Pedro" and "El Colegio" farms which belong to the Cuenca archdiocese and to the Azoguez diocese, respectively.
3. Chimborazo Area: It is located in the province of the same name. One of its sub-areas is already defined, Columbe, and two others are yet to be established: Pangor to the West of the province and Colta on the Sicalpa-Guamote road.
4. Northern Area: Situated north of the mountain. This is the most extensive area from the geographical point of view. The first three sub-areas are: Quero and Cribuelo in the province of Tungurahua and Abra in Imbabura; another is planned for the Chota valley.

The area teams are multi-disciplinary and cover agrotechnical, economic-accounting and socio-organizational matters. The central team job is coordination on a nation-wide scale and support to the different teams. It is in charge of three main fields of work: Administration and financing, study and planning and execution.

4.1.3 Research Activities :

CESA has carried out some studies which are directly related with its work in the countryside :

- ° In order to develop its Agrarian Reform activities, CESA's team has carried out research which serves as a base for programming and optimum utilization of natural and human resources in relation to concrete conditions existing in a specific place and on the basis of peasant group participation in decisions.
- ° It has made diagnoses of the work sub-areas with the collaboration of the peasants.
- ° It has also carried out studies to detect marketing characteristics and the fundamental existing marketing channels. The first of these studies, on the coastal area, analyses the situation of the small rice producers in the Guayas river basin; the second is related to marketing in four mountain provinces.
- ° There is a project for research on communications in peasant areas, specifically on "Peasant decoding of messages sent from the city". Arrangements are being made for financing it.

4.2 The Social Research Group of the National Planning Board's Social Development Division - JUNAPLA.- *

This group of 20 researchers, mainly sociologists and economists, is dedicated to do basic social research. Its activity does not support the Social Development Division's programs; its aim is to generate basic information on aspects related to social change in Ecuador.

This group was originally financed by UNICEF, but is now financed by JUNAPLA.

It is an important group due to the number of researchers, its stability and the importance of its work may have for JUNAPLA's programming. It is also going to work with FLACSO, Latin American Social Sciences Faculty.

This department, based in Chile, is undergoing a decentralization process by establishing seats in other Latin American cities, Quito being one of them. It will give post-graduate courses on development problems and will create a research section which will work in coordination with the group of JUNAPLA's Social Development Division.

* Information obtained from the interview with Gonzalo Abad from Social Research - JUNAPLA-, Quito, March 1976. Typed. IDRC-LARO-PSU.-

5. RESEARCH AND THE COUNTRY'S NEEDS.-

Research in Ecuador's agricultural sector, specially INIAP's, has been directed mainly at solving technological production problems, but, socio-economic research has also been done on a very small scale. Undoubtedly, technological research has undergone an important development and has provided extremely useful experience, resources and results for the country's economy, even though, as we shall see below, there are several problems which restrict or deviate its real impact on the sector.

INIAP's research programs cover a wide variety of products, but according to many of the interviewees, there are still many crops left out which could be of great economic importance either because they are traditional food staples of the Ecuadorian people or because they offer possibilities for agroindustrial development. The establishment of a new program is a slow and expensive process which demands availability of equipment, financing and trained personnel; this complicates the task of taking on research on the crops mentioned above and makes research being done at present depend partially on training, tastes and availability of technical personnel.

Socio-economic research, on the other hand, has been very scarce; entities such as the Planning Board, the Ministry of Agriculture or the Ecuadorian Agricultural Service Center (CESA) have begun to delve into this field but their efforts are still minimal in relation to needs. The absence of this type of research affects the sector's programs in general, from global planning to diffusion of agrotechnical research itself.

The formation of a department of agricultural economics in INIAP is one of the efforts directed, in part, at solving the problems pointed out for both types of research. This department will begin a series of agro-economic studies from

which production, marketing and other problems can be determined for each crop. This information will serve as a guide for the creation of new programs or for adapting the existing ones to suit needs.

6. THE IMPACT OF RESEARCH.-

As has been pointed out, agrotechnical research in Ecuador has reached a level of considerable development and of recognized quality; the concern of many of the interviewees is therefore not directed toward research itself but toward the impact which it has had on productivity. *

There is almost total concensus in stating that research has benefited large and medium producers, related to commercial agriculture whose competitive character, high entrepreneurial capacity and resource availability make them very permeable to technological innovations. On the other hand, a great mass of small farmers and "minifundists" who make up the majority of the rural population, has been almost totally excluded from the benefits of research.

The causes and projections of this situation form a complex network of social, cultural, economic administratives and other problems whose clarification and solution greatly depends on the country's agricultural progress.

* See Table in the Appendix showing differences in yield between products which have been researched and those which have not been by INIAP in one decade.-

Following is a brief exposition of the main factors which, in the opinion of the interviewees, are obstacles to the impact of research.

6.1 Research Diffusion Mechanisms.-

The first type of problem is found in those mechanisms whose function is to apply research results to production, specially agricultural extension activities and distribution of seed or varieties improved by INIAP.

INIAP, in addition to research, also carries out diffusion activities such as minicourses for producers and extensionists, field days and regional trials in demonstration plots. These activities allow research to reach certain strata of producers who because of their characteristics are receptive to it, and in some fields, such as with Africal Palm or cattle raising, the impact of research has been important.

However, INIAP cannot develop these diffusion activities as much as desirable because it lacks adequate infrastructure and resources for this. The Institute has experience in trying to get its technicians to do research and extension at the same time, but the result is that the demand for extension becomes an obstacle to research.

Extension as a nationwide activity is the responsibility of the Ministry of Agriculture which, on the one hand does not have sufficient personnel, and on the other hand, does not have a close relationship with INIAP.

This disassociation between the two entities complicates the transmission of research results in the extensionists as a consequence of which a good part of the results stay in the experimental stations.

Extension needs by far exceed INIAP's functions and resources and pose a problem of institutional coordination and of revision of mechanisms which have been used for this up to now.

Something similar occurs with the supply of certified seed : INIAP produces a limited quantity of seed for the main crops and in collaboration with an enterprise specialized in this branch. However, the efforts of these two entities still are not enough to satisfy the demand. The limited reproduction of seed hinders the diffusion of varieties which could result in greater productivity. This is more noticeable in the small farmer for whom it is more difficult to acquire such inputs.

6.2 The Sector's Operation.-

A second type of problem are certain general characteristics of the agricultural sector related to loans, marketing, land tenure and availability of various inputs. Deficiencies in these areas negatively affect the impact of research.

The main credit organism is the National Development Bank whose programs are oriented toward the medium and small farmer, specially if organized in cooperatives, on the basis of a set of priorities for financing certain products and in coordination with the Ministry of Agriculture's technical assistance. The Bank performs an important function in certain crops for those farmers who make their demand for credit effective -and who organize themselves in cooperatives-. However, a very large mass of "minifundists" who make up the majority of the Sierra's population, is left out.

Marketing is one of the largest problems faced by the sector, specially for certain regions and products for domestic supply. The lack of research on the problem further complicates planning and state action to try to solve it.

The same could be said about the availability of inputs, specially in regions remote from the cities. However, what is really important in this set of problems is the fact that its solution cannot be isolated. There actually are institutions which have experience in offering services such as credit, technical assistance, etc. But the lack of a single one of these elements in a specific situation could completely annul the benefits of the rest. Research, which is only one link in the chain, loses its impact in direct proportion with any faults in the functioning of the whole.

Comprehension of this has led to giving inter-institutional coordination in concrete problems much importance. One of the ways of approaching it is Integrated Rural Development which is being carried out in some regions.

6.3 Characteristics of the Population.-

The set of economic and socio-cultural characteristics of producers who are potential beneficiaries of research is one of the factors on which its impact depends. In this sense, the Ecuadorian countryside has some notable particularities: The existence of large groups of indians who to a greater or lesser degree keep their language, cultural traditions, systems of land tenure and production, etc.; and the existence of a great mass of minifundistas peasants with marked indian ancestry in the mountain

range and others of diverse cultural characteristics on the Coast. Any action which is to be efficiently directed toward these groups must be based on scientific knowledge of their characteristics, technological capacity, forms of production and organization, etc. The simple procedure of considering them backward, traditionalists and impermeable to innovations cannot solve the problem. The lack of research which can cast a light on these factors -an activity which was only recently begun-, has caused state programs, which were designed with the aim of benefiting the population, to have effects contrary to those desired or simply lacking any importance. In relation to agrotechnical research, the question of which characteristics it should have in order to benefit these groups as well as which forms of technical, credit, marketing, etc. assistance are the most effective, is still relevant.

6.4 Obstacles to Research.-

Refers mainly to the resources available to carry out research. INIAP's existing infrastructure and financial resources has been enough to develop a significant research capacity. However, INIAP has difficulties in opening new programs or extend its action to different geographic areas, and other Institutions such as local Universities have to endure the lack of resources of all kind.

With regard to human resources, research is facing the private enterprises' competition, as its main problem. Researchers prefer to collaborate with private companies than with government agencies because the latter do not offer any special salary grading stimulus or fringe benefits. This is a very serious problem for INIAP, which not only affects continuity in research, but also implies a loss in education and training investment.

7. SOME SOLUTIONS

The problems described above are a cause of concern for the sector's researchers and planners who have begun some action to try to solve them.

INIAP, as the main research center, considers that at this moment priority should be given to the diffusion of research results and has taken some steps in this direction. We already mentioned the creation of a Department of Agricultural Economics whose studies should point out aspects to be given priority within each program. In addition to this department, there are plans for a Production Department in charge, not only of research, but also of the diffusion of its results and supervision of its application.

One project which is being worked on with the aim of being put into operation next year (1977) is the training of "production technicians" who, placed in Regional Centers are to carry out research, extension and inter-institutional coordination. These technicians must have enough knowledge of research to be able to carry out regional trials of the Institute's programs and detect problems in the crops of his area and solve them or refer them to INIAP's stations. They must also work with the Ministry's extensionists and with functionaries of other institutions of the sector in order to offer services in a coordinated way. This project will probably begin to function in some regions as a pilot project on the date mentioned, by using already trained technicians until new ones can be prepared, something which may take from one to two years.

The projects for Integrated Rural Development have an important place in the aspect of integrated activities. On the part of the Ministry of Agriculture, the Rural Development Division is the one in charge of these programs with the responsibilities of promoting peasant organizations and coordinating the activities of the other divisions for each specific zone.

The Ecuadorian Agricultural Service Center's (CESA)* activities are specially interesting as it works with poor peasant by offering an "Integral Service pack".

The Center works with peasant organizations to which it gives credit, technical assistance, marketing and education with a totally new methodology; credit is granted to organizations -without conceding importance to their legal status- and as with the other services, the only condition is the peasant's active participation through their organization.

This project as a whole is oriented toward promoting the capacity of some peasant groups for participating in the decision making process at all levels. The perspective implies the integration of services and their canalization through the organization as an alternative to traditional segmentation of services by institutions and their passive reception from the peasants. In relation to peasant adoption of technology, the result of the experience has been positive, allowing them to increase productivity.

II RESEARCH NEEDS

1. EXPERIENCE IN DETERMINING RESEARCH PRIORITIES

The establishment of priorities for Ecuador's agricultural sector's programs has been carried out in the past years by the Ministry of Agriculture, the Planning Board and other specialized entities, as a means of rationalizing resource use. Two significant research projects have been carried out in this sense; the first in INIAP in 1973, by the Agricultural Economy Department; and the second, by the Planning Board Science and Technology Division, which is being written up (May 1976) and therefore definite results are not yet known. Another important effort, which although not directly related to research has implications about it, was carried out by the Ministry of Agriculture and the Planning Board in the context of the "Operative Program for Domestic Food Supply".

1.1 Priorities in INIAP.-

The work carried out by INIAP selected a set of products divided into two groups: Those in which INIAP had research programs and those which though important to the country's economy were not being researched. Taking the sector's development policies as a base, six quantifiable criteria were selected, in relation to which the products were assigned relative values. The criteria were :

1. Number of farmers benefitted
2. Incidence in the balance of payments
3. Future growth of demand
4. Production value
5. Employment of labor
6. Social impact

From the assignation of relative values to the product in each criterion, and to the criteria as a whole, an order of the first was derived according to their priority for designating Research Resources. The results can be expressed in three orders of priority :

1. High priority : Cereals
Cattle raising
Oleaginous plants
Banana
Vegetables
2. Normal priority: Rice
Coffee
Cacao
Fruit trees
Sugar
Potato
3. Lesser priority: Pellitory
Cotton
Tobacco
Cassava

The comparison of results obtained with the programs being carried out by INIAP showed almost total coincidence between the two and the importance of beginning new programs in the following order :

- | | |
|-------------|--|
| Priority 1: | Poultry raising
Banana
Vegetables and leguminous
plants |
| Priority 2: | Fruit trees
Sugar |
| Priority 3: | Pellitory
Tobacco
Cassava |

After the study described, a banana program has been started and financial resources are being arranged for aviculture, vegetables and leguminous plants.

INIAP has not up-dated the study according to the sector's new policies. The Agricultural Economic Department considers, as was mentioned previously, that at this moment it is more important to make studies to permit the determination of aspects or problems which should be given priority within each one of the present programs to adapt them in this way to national production conditions.

1.2 The Priorities of the National Planning Board's Science and Technology Division.-

The National Planning Board's Science and Technology Division recently began the work of establishing priorities for agricultural and industrial research, framed within the task of drawing up a scientific and technological policy.

The work effectuated up to now is only experimental and for the division's and the Board's internal use. Its methodology has been quite similar to that used in INIAP's study, already mentioned, using slightly different criteria.

On the basis of the National Development Plan and of some requests sent by the provinces to the President of the Republic in 1973, the following objectives were set as criteria for establishing priorities :

a) Social :

- ° Improvement of living conditions
- ° Improvement of income distribution
- ° Generation of jobs
- ° Increase consumption

b) Technological :

- ° Increase productivity
- ° Utilization of certified seed
- ° Increased harvested area
- ° Increased cultivated area

c) Economic :

- ° Elasticity of domestic supply
- ° Investment
- ° Import substitution
- ° Increase exports
- ° Number of provinces affected

The following list, in order of priority for research, was obtained by assigning relative values in each objective to 26 economically important products, and to each objective in the set :

- | | |
|-----------------|-----------------------|
| 1. Sesame | 14. Cacao |
| 2. Manila hemp | 15. Leguminous plants |
| 3. Wheat | 16. Fruit trees |
| 4. Cotton | 17. Vegetables |
| 5. Banana | 18. Barley |
| 6. Peanut | 19. Castor oil plant |
| 7. Rape | 20. Tobacco |
| 8. Pellitory | 21. Tea |
| 9. African palm | 22. Coffee |
| 10. Soybean | 23. Rubber |
| 11. Oats | 24. Hard corn |
| 12. Rice | 25. Soft corn |
| 13. Sugar cane | 26. Potatoes |

In order to continue the work, once this list of products was obtained, it would be necessary to form technical committees to determine each product's principal problems, giving origin, in this way, to research projects. This task, as has been mentioned, has been carried out with an experimental character and the Science and Technology divisions has found the method used not very reliable. It is possible then that the job will be completed by resorting to other points of reference establishing a definite order of priorities. The Science and Technology division's collaboration with the interviews which are one of this documents sources, contributes useful elements in this sense.

1.3 Operative Program for Domestic Food Supply.- *

* See MAG-JUNAPLA "Alcances Generales para la Preparación del Programa Operativo para el Abastecimiento Interno de Alimentos. Mimeographed. Undated.-

In 1975 the Planning Board and the Ministry of Agriculture began a joint project which produced, as a result, the "analysis of the agricultural sector's behavior 1973-1975", with FAO's collaboration. The second stage of this joint project concentrated on a short range operative plan for food supply. For this program, priorities of products considered critical for domestic supply were established, and the Ministry's and the sector's institutions were to concentrate their activities on these products in order to increase their production.

Studies on consumption, production behavior, foreign trade and prices were taken into account in assigning priorities.

This is the order assigned :

1. Cereals:

- Wheat
- Rice
- Soft and hard corn
- Barley

2. Oleaginous Plants:

- Peanut
- Soybean
- Sesame
- Cotton (seed)
- Africal palm

3. Leguminous Grains:

- Beans
- Lima bean
- Peas
- Lentils

4. Industrial Plants:

- ° Sugar cane

5. Tubers:

- ° Potato

6. Animal Husbandry, meats :

- ° Beef
- ° Pork
- ° Lamb
- ° Poultry
- ° Milk
- ° Eggs

7. Other :

- ° Fish

2. RESULTS OF INTERVIEWS ON RESEARCH NEEDS

The most important problem discussed in the interviews held with a group of representatives from the sector's main planning, executive and researching organisms was that of research needs and priorities. The opinions expressed by the interviewees greatly coincided in pointing out some aspects, problems or criteria as being particularly important for agricultural research in Ecuador. Following is a summary of the points on which there was general consensus among the interviewees.

2.1 Criteria for Assigning Priorities.-

The criteria for assigning priorities for agricultural research are partially derived from the analysis presented above on the utility and impact of such research.

The first great criterion pointed out refers to giving priority to everything which will strengthen the country's capacity to produce food for domestic supply, and, in this sense, to substitute imports. Ecuador has been facing a decrease in production of some important items for feeding the country,* for which reason it has been forced to increase imports. In addition, nutritional problems in many areas, specially with the indian and peasant population in the mountains and on the coast, are important.

Enlarging upon this criterion, it is considered that research must be directed toward both traditional and new products, specially to those which make up the Ecuadorian people's habitual diet.

A second outstanding criterion refers to the population group which must be benefitted by research: Research should be carried out for the poor peasants, specially for the mountain "minifundistas", so that they may be able to produce surplus on their plots. In this aspect, research on cooperatives and social research which try to provide detailed information on the groups which

* See Diagnosis, Table No. 12, page ____.-

will be benefitted play an important role. According to an interviewee, their aim is to "generate technology which is adapted to the country's human and physical resources".*

The last criterion pointed out refers to a geographic area in which there is very little development but is of growing importance because of its spontaneous population growth: The East. Migration from areas where there is growing pressure on the land to the eastern slope of the mountain range and to the jungle is increasingly significant. The settlers lack the technology which will give them a satisfactory standard of living and lead to rational use of the resources available to them.

2.2 Priorities according to Products.-

The application of the above criteria to important products produces, as a result, an order of priorities on which the majority of the interviewees agreed, with very few differences :

1. First priority goes to cereals, oleaginous plants, banana, and cattle and poultry raising. These are all being researched by INIAP except aviculture. Among the cereals wheat stands out because it is imported in large quantities; the strength-

* Fernando Velasco (CESA).-

ening of national production can depend on the development of tropical varieties of this cereal according to some. Other cereals such as barley, hard and soft corn, oats, rice, etc. pay an important role in both human and animal nutrition, specially for planning because they can partially substitute wheat and alliviate the problem of its cronic scarcity to a certain extent.

In this group of cereals it is worthwhile to point out *Chenopodium quinoa* which is a traditional element in the diet of the peasants and indians who live in the mountains. Lately it has been arousing great interest, not only in Ecuador, but also in Peru and Bolivia, because of its high nutritive value.

Oleaginous plants are being researched by INIAP, specially Agrical Palm on which they have concentrated the greatest efforts; to a lesser degree research is done on soybeans, peanuts and sesame (production of the latter has diminished in the past few years).*

During several years banana has been the base of Ecuador's agro-exporting economy, and though it has yielded its place to oil, it is still very important. Banana research was only recently begun in INIAP and therefore its cultivation technology has been produced mainly in other countries and by private producers.

* See Diagnosis, Table No. 12.-

Cattle raising and aviculture are also items on which the improvement of the country's nutritional conditions depends. On the one hand, there is still considerable capacity for sustaining more head of cattle but, on the other, milk and its derivatives are imported.

2. The second priority (for some the first) corresponds to leguminous plants, vegetables and fruit trees.

In Ecuador there has been very little research done on these items; programs are about to begin on some of them.

Leguminous grains (peas, lima beans, lentils) and vegetables can, in addition to their importance as food, be a source of income for small peasants in the mountains on whose plots these might be more profitable than other crops.

Fruit trees are the source of livelihood in some provinces where they are abandoned to traditional technology and very low productivity. Fruit trees can also be of great significance in the mountains and offer important perspectives for agro industrial processing which also requires research.

3. Other products which without being as significant as those mentioned above, were recognized as important are: potato, cassava,* sugar cane, plantain,

* Up to now INIAP has done no research on cassava except for collecting several varieties a few year ago. In April, 1976 CIAT visited the Pichilingue experimental Sta. to begin work with them.-

cotton and cacao. Some of these products (potato, cassava and plantain) are food staples in some regions and the others are important for agroindustry.

The following is a summary of what was explained above in the form of a list according to groups (the products within each group do not imply an order of priorities) :

1. Cereals:

- ° Rice
- ° Wheat
- ° Barley
- ° Hard and soft corn
- ° Oats
- ° Chenopodium quinoa

Oleaginous:

- ° African palm
- ° Sesame
- ° Peanut
- ° Soybean
- ° Banana
- ° Cattle raising
- ° Aviculture

2. Legumes :

- ° Lima beans
- ° Beans
- ° Peas
- ° Lentils

3. Vegetables
Fruit Trees :

- ° Potato
- ° Cassava
- ° Plantain
- ° Sugar cane
- ° Cacao
- ° Cotton

2.3 Research Topics or Aspects.-

In addition to research in the products mentioned, or in other words, to technological research aimed at direct increase in production, other specific topics or aspects to be researched were pointed out which transcend the competence of this activity. They mainly correspond to the field of the social sciences (Economy, Public Administration, Anthropology, Sociology, etc.). Their importance is derived from the complexity of the sector's problems and they are indispensable tools for the state institution's programming and execution of activities. The main topics mentioned are :

2.3.1 Regionalization of the country for agricultural planning; regionalization must be complemented with studies such as :

- a) Detection of better ways of using soils on a regional level.
- b) Studies on marketing and domestic and foreign markets for those products with the most marketing problems.

- c) Choosing those regions which are focus of agricultural development and should therefore receive special attention.

2.3.2 Comprehensive studies on Credit:
Credit needs in various sectors and the most adequate mechanisms for satisfying them.

2.3.3 Determination of the Ecuadorian countryside's general evolutionary tendencies, specially of social and economic relations.

- a) Studies on tendencies in land tenure changes, Agrarian Reform and colonization and peasant organization.
- b) Social and anthropological studies on indian and peasant communities, their forms of communication, culture and organization as well as their forms of production, marketing and economic life in general.

2.3.4 Studies on the population's consumption and nutritional habits.

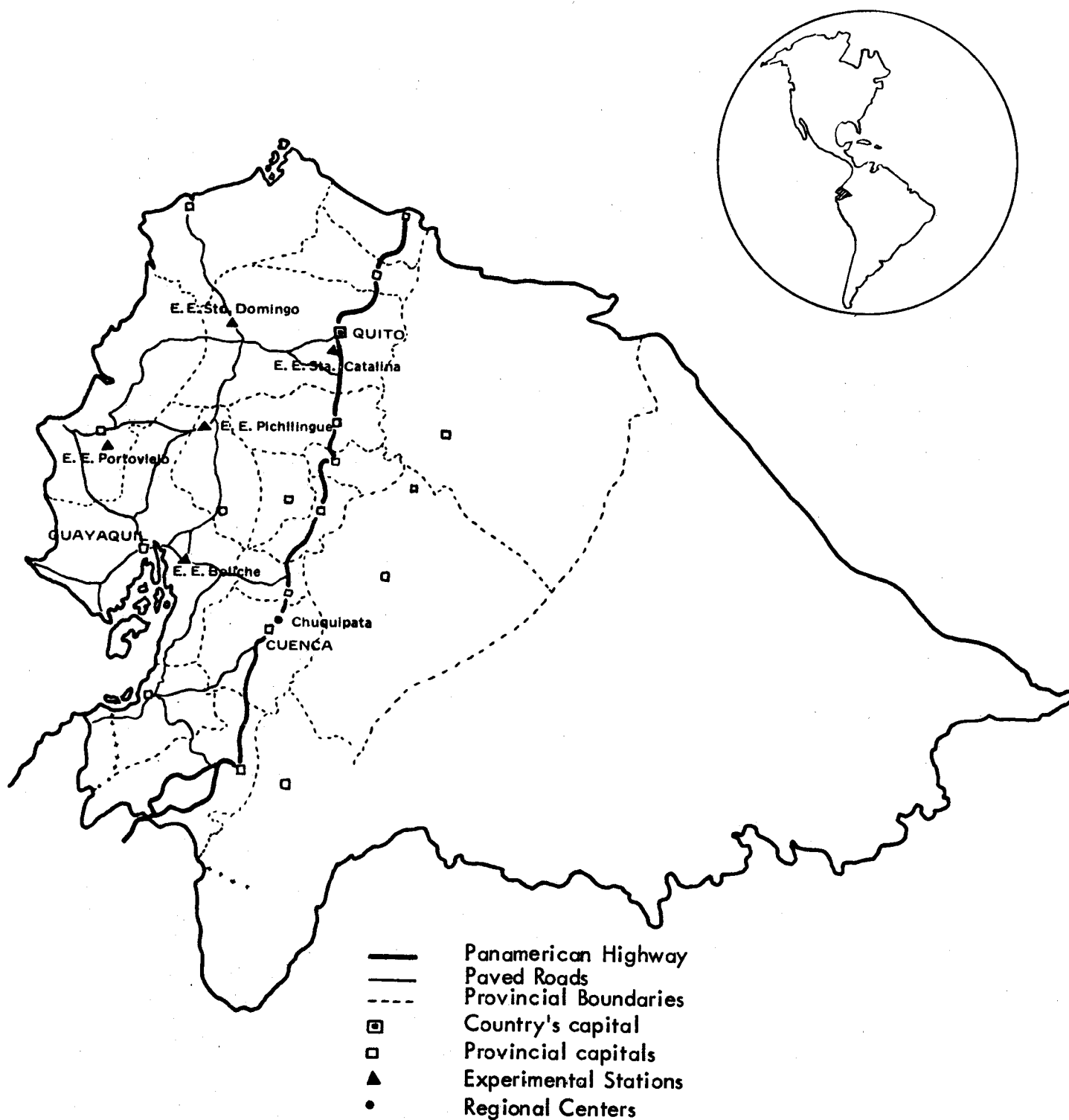
2.3.5 Administrative studies of the sector's institutions, of their operation and coordination, in order to make the execution of their programs more efficient.

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A P P E N D I X

NATIONAL AGRICULTURAL RESEARCH INSTITUTE



Source: INIAP, "Informe Divulgativo 1974".-

"SANTA CATALINA" EXPERIMENTAL STATION

PROGRAMS	Trials				Regional Trials		Registered & Certified Seed Distributed to the Farmers		No. of Scholarships		Tech.w/ Foreign Special.		Post-Graduate Degrees	
	Planned		Executed											
	1973	1974	1973	1974	1973	1974	1973	1974	1973	1974	'73	'74	'73	'74
Wheat	76	78	78	87	25	30	8,636.36 K	30,409.09 K						
Barley	47	57	47	58	21	27	11,272.72 K	20,863.63 K	3	2	1		1	
Oats	45	45	45	58	23	27	7,220.68 K	7,454.54 K						
Corn	52	51	51	50	25	32				1	2		1	
Potato	16	17	12	17	3	5	14,545.45 K	17,401.36 K		2				1
Cattle Raising and Grasses	30	48	27	28		3	443.18 K	.375 K	8	9			2	
Seed Production	9	7	8	7						3				
Porcine Cattle	26	9	2	1					1	1	1			
Seed Certification										1	1			
Phytopathology	15	19	15	19	6	9					1		1	
Entomology	8	7	8	7	1	1								
Weeds	7	11	5	10	2	8								1
Soils	49	104	50	92	27	33			2		2	2	1	1
			2448*	5878*										
Nutrition	3	4	3	4		1			3	2				
			5345**	18,513**										
Statistics			1450***	2746**					1	2				
Agricultural Economics****	19	9	10	11					4					
TOTAL:	402	466	361	449	133	176	42,118.39 K	76,503.62 K	22	23	6	4	6	3

* Soils and plants analysis.

** Chemical and Bromatologic Analysis.

*** Statistical Analysis.

**** Seat of the Central Administration.-

- 2 - " PICHILINGUE " EXPERIMENTAL STATION											
Cacao	13**	24**	3	10			3,052 P 182 P 2,041 M 2,541 M 1,762 PC 10,760 PC 120 P 2,959 P 32.72 K 305.45 K 142,727.27 276,152.72 K	4	4		
Coffee	5	4	5	2	1*						
Corn	34	20	32	25	26 31			2	2		
Entomology	12	24	8	20	3 4			1			
Phytopathology	16	21	11	14	3*			2	1	2	1
Soils	14	13	12	13				3	3	1	
Weeds	9	7	7	7				1	2	1	
Grasses and cattle raising	34	43	31	39	15*	151 m ³	48 m ³	13	10	3	1
Production Department	39	32	29	23				1			2
Ramie						60 m ³	73 m ³				
Manila hemp						20 C	1,000 C				
"Pachaco"							5,317 P				
"Pachaco"							27.27 K				
TOTAL:	176	183	138	153	29 54	4,934 P 19,218 P 2,041 M 2,541 M 1,762 PC 10,760 PC 211 m ³ 121 m ³ 142,779 K 276,485.44 K		27	22	7	2
											3

* Regional 1973 - 1974

** Without counting those already established.

Note: These Tables show the activities carried out in the Experimental Stations during 1974.-

" BOLICHE " EXPERIMENTAL STATION												
Rice	13	9	5	9	19	15	9,863.63 K	47,545.45 K	2		3	2
Cotton	5	8	4	8	3	3	1,818.18 K			1	1	
Oleaginous Plants	16	18	16	23	5	15	10,302.27 K	33,900.45 K	2	2	2	
Leguminous	4	7	4	8	1	5			1	1	1	
Entomology	10	6	4	3	4	10			2		2	
Phytopathology		6		3		2					1	1
Weeds	9	9	8	12	9	8			1	1	1	
Soils	4	14	4	16	4	21			2			1
Corn		10		10								
TOTAL:	51	87	45	92	35	79	21,984.08	81,445.90	10	5	13	1 3

- 4 - " PORTOVIEJO " EXPERIMENTAL STATION											
Cotton	20	14	18	14					1	1	
Oleaginous	20	22	20	22		10.982	K	18.317	K	2	
Grasses	4	5	3	5	2	2					
Soils	8	9	7	9	5	3					
Entomology	8	13	2	13		2			1	1	
Phytopathology	10	10	3	10		2			1	2	1
Weeds	6	8	6	8		1				1	
Corn	14	0	7	0				6.500	K		
Wheat	9	10	0	10		2					
Seed production										1	1
TOTAL:	99	91	63	91	7	12	10.982	K	24.817	K	4 6 4 1

- 5 - " SANTO DOMINGO " EXPERIMENTAL STATION														
African Palm	25	19	25	18	1	1	7.918	P	9.456	P	2	1	1	1
							231.753		171.928					
Porcine cattle	8	8	4	6	0	0					1	2	3	
Entomology	13	11	10	10	4	4							1	1
Phytopathology	6	7	4	5	0	1					1		1	1
Soils	7	5	5	3	1	1								
Grasses					3	3					1			
TOTAL:	59	49	48	42	9	10	7.918	P	9.456	P	5	3	3	3
							231.753		171.928					

K Kilos
 M Ears
 P Plants
 PC Seedings
 C Stubs

Source: INIAP "Informe Divulgativo 1974".-

TABLE No. 1 : PRODUCT YIELD IN ECUADOR (per Hectare)			
Products	1962-4	1971-3	Tendency
----- Metric Tons -----			
INIAP *			
Cacao	0.23	0.27	Increase **
Soft Corn	0.67	0.70	Stable
Rice	0.89	1.40	Increase
Potato	9.17	12.53	Increase
Coffee	0.30	0.27	Stable
Barley	0.63	0.70	Increase
Wheat	0.90	0.93	Stable
Hard Corn	0.84	1.07	Increase
Castor Oil plant	1.5	0.8	Decrease
Cotton	0.53	1.43	Increase
Peanut	0.70	0.90	Increase
Sesame	1.00	0.87	Decrease
NO INIAP			
Banana	19.20	19.50	Stable
Sugar Cane	87.80	62.25 ***	Decrease
Cassava	8.20	11.10	Increase
Beans	0.50	0.43	Decrease
Onion	27.70	10.27	Decrease
Plantain	20.53	12.27	Decrease
Pineapple	21.13	19.33	Stable
Lentils	0.43	0.34	Decrease
Peas	0.60	0.60	Stable
Avocado	15.80	7.50	Decrease
Cabbage	37.90	31.43	Decrease
Oranges	23.20	14.20	Decrease
Tomato	36.63	15.87	Decrease
Lima Beans	0.57	0.70	Increase
Water Melon	7.13	5.23	Decrease
Pellitory	0.40	0.43	Stable
Tobacco	0.87	0.90	Stable

* Products for which INIAP has a research program.

** Stable tendency: Change under + 10%. Decrease: Change over or equal to -10%. Increase: Change over or equal to + 10%.

*** Average for 1972 and 1973.-

Source: Dow, "Agricultura en Cifras", 1974.-

GUIDE FOR THE INTERVIEW :

1. Has agricultural research up to this point been related to the needs of the sector's development ?
2. Has it had significant impact ? Yes. No. Why ?
3. Generally speaking, which groups of producers have benefitted most from agricultural research ? Why ? Should this be modified ?
4. Keeping the sector's development in mind, what are your criteria for establishing research priorities ?
5. Based on this criteria, to which products, groups of products or aspects affecting the sector's efficiency would you give priority ?
6. In the Stations :
 - Main problems and obstacles affecting research development.
 - Physical resources
 - Financial resources
 - Human resources
 - Administrative resources
 - Infrastructure resources

LIST OF INTERVIEWEES :

- National Agricultural Research Institute (INIAP):

Enrique Ampuero, Director
Kamal Dow
Carlos Elizalde
Romulo Solis

- "Pichilingue" Experimental Station :

Eng. Cortazar, Director
Jaime Vera, Cacao and Coffee Program
Raul de la Torre, Grasses and Cattle raising
Program

- "Boliche" Experimental Station :

Saul Mestanza, Director

- "Santo Domingo" Experimental Station :

Victor Napoles, Director

- "Santa Catalina" Experimental Station :

Raul Escobar, Director

- Science and Technology Division :

Angel Matovelle
Grecia Suarez
Alfredo Recalde

- National Planning Board (JUNAPLA) :

Luis King, Technical Director
Manuel Segovia, Agricultural Sectorialist
Adolfo Pons
Mario Leon, JUNAPLA's Representative before
INIAP
Gaston Acosta
Manuel Arias, Nutrition
Luis López, Social Research
Eduardo Santos, Social Research
Gonzalo Abad, Social Research

- National Banana Program (PNB) :

Alejandro Bohorques, Technical Sub-Director

- Ministry of Agriculture and Animal Husbandry (MAG) :

Alejandro Cobo, Marketing Direction -Sub-Director
Cristobal Barba, Agricultural Development Direction
Jaime Narvaez, Forestry Development Direction
Gonzalo Jaramillo, Rural Development Direction
Jaime Estrella

- Agricultural Engineering Faculty :

Nelson Peñafiel, Dean

- Technological Research Institute (IIT) :

Oswaldo Proaño, Director
Jaime Velasquez

- Ecuadorian Agricultural Service Center (CESA):
Fernando Velasco
- National Development Bank (BNF) :
Eng. Larenas, Technical Sub-Director
- Banana Plantation - Ecuadorian Agricultural Products (PAE) :
Victor Napolitano
- Cattle Raiser's Society :
Arturo Gangotena, President
- F.A.O. :
Armando Falla, Forestry Project Director
Tomas Lopez, Programming and Marketing Project
Director
- P.N.U.D. :
Juan Pascoe, Director